

**WALL-COATING MATERIAL, AND WALLPAPER
AND WALL MATERIAL EACH COATED THEREWITH**

TECHNOLOGICAL FIELD OF THE INVENTION

[0001] The present invention relates to a wall-coating material mainly composed of a wood powder, and also relates to wallpaper and a wall material (viz., a wall-forming or wall-constituent material) each coated with the wall-coating material.

BACKGROUND ART

[0002] Some types of wall materials or papery materials have been proposed for use as the interior materials in various buildings, as disclosed in Patent Documents 1, 2 and 3 listed below. Such prior art materials have been made by blending any polyvinyl chloride resin or any polyolefin resin with a wood powder, so as to provide a mixture from which any desired plate-shaped articles should be molded.

¶ References:

Patent Document 1: Japan Laying-Open Gazette No. Hei. 06-322187

Patent Document 2: ibid. No. 2001-342315

Patent Document 3: ibid. No. 2002-129021

[0003] The walls formed of the plate-shaped blended mixture of a wood powder and a synthetic resin have had a surface giving a hard and adamantine feeling inherent in the resin. Due to poor hygroscopicity and unsatisfactory auto-dehumidification nature, there has been a drawback to these prior proposals. In a case wherein the blended mixture comprised a polyvinyl chloride resin, such a composite wall material was inexpensive and easy to process and handle in construction works so that it has spread its use. However, toxic gases emitted from such a wall material mixture in the event

of a fire have recently reduced the use of polyvinyl chloride-containing wall materials. Waste pieces or the like scrap produced when processing or handling the wall material, as well as broken parts of a pulled-down building, have sometimes been incinerated. Acid-proof furnaces not likely to generate dioxins have been demanded, though the pre-sorting and special pre-treatment of those waste pieces, scrap and/or broken parts have caused much labor and expense. In another case wherein the wall material comprised a polyolefin resin, incineration of the waste of building or house walls could be done diminishing generation of toxic gases. Such an alternative wall material has however been too hard and rigid to easily process, and has not been less expensive as compared with the conventional ordinary wall materials already known in the art.

DISCLOSURE OF THE INVENTION

¶ OBJECTS TO BE ACHIEVED HEREIN

[0004] A primary object of the present invention that was made to resolve the problems inherent in the prior art is therefore to provide a novel surface-coating material that is mainly composed of a natural wood powder neither compressed nor molded, contrary to the prior art building materials. In a state of the present wall-coating material produced inexpensively and subsequently applied to any target surface, it has to produce fine roughness or ruggedness in this surface and to thereby give it a unique feeling of warmth that has not been observed on smooth surfaces. It should not only be moderately hard and strong, but also be highly hygroscopic, and should ensure a soft and elegant texture.

[0005] Other objects of the invention are to provide a wallpaper composed of a soft and flexible sheet such as paper, ordinary cloth or non-woven fabric decoratively coated with the above-noted wall-coating material, and also to

provide a wall-forming material composed of any plate-shaped building parts, columnar parts, concrete blocks, bricks, woody panels, plaster boards or the like each decoratively coated with the wall-coating material.

¶ SOLUTIONS

[0006] In order achieve this object, the following countermeasure and means are employed herein. The wall-coating material of the invention is a mixture that comprises as its major ingredient a wood powder contained at from 55 % to 90 % by weight and blended with a natural binder (often called "size" or "sizing") such as starch, and further comprises as minor ingredients a fungicide, an antiseptic, a flame retardant powder, and at least one pigments.

[0007] In the above mixture, the binder may be contained for example at 20 % by weight or less, and the powders of fungicide and/or antiseptic contained at 4 % by weight or less. The flame retardant powder may be contained at 15 % by weight or less, with the natural pigments being contained at 6 % by weight or less. Two or more of 120 mesh powder (i.e., a powder whose most particles can pass through a 120-mesh screen), 200 mesh powder and 300 mesh powder may be used in combination. Such a characteristic mixture of the powder species is the wood powder proposed herein to realize any demanded feeling of roughness of the wall surface. If necessary, 400 mesh powder and 500 mesh powder may further be involved in addition to 120 – 300 mesh powders and also in any desired combination therewith. A fine ruggedness thus formed in the coated surface will give it a feeling of warmth.

[0008] 1 (one) part by weight of the composition summarized above as the wall-coating material may be kneaded using about 5 – 7 parts by weight of water, so as to prepare a mortar-like or paste-like slurry. This slurry may

be applied to and dried on substrates such as tough paper sheets, fiber-based cloth sheets, non-woven fabric or the like sheets, to thereby produce wall-paper sheets. The application of said slurry to the substrates can be done herein by any proper technique, for example by means of a brush, a trowel, a spray gun or the like. 1 kg of the wall-coating material may normally be enough to cover an area of 5 – 6 m² of each substrate, and if coated thinner, to cover a larger area of 10 m². Thickness of the thus produced coating layer will fall within a range of from about 1 mm to 2 mm. The binder contained in the slurry of wall-coating material will function to firmly retain the coated layer while it is being dried to solidify. Once the coated layer solidifies, it becomes hard enough to be protected from peeling off or being stained, even if exposed to water. By virtue of this feature, such coated sheets may be used as exterior wall-forming materials, possibly covering any earthen wall.

[0009] The wall-coating material kneaded with water may also be applied decoratively to any of: wood plates as building parts, various meal plates, rod, pipes, concrete blocks, bricks, woody panels, plaster boards and the like, in a manner similar to that noted above. Wallpapers and building materials thus prepared are soft and warm both to the touch and in the sense of vision, and surpass other similar materials in air permeation and humidity self-regulation owing to their hygroscopic and moisture releasing nature.

[0010] Employable herein as the raw material are any botanical species such as white cedars, Japan cedars, pines and the like needle-leaf trees, or Japanese beeches, various oaks, cherry trees and the like broadleaf trees. The wood powder is prepared mainly using lumber provided as the byproducts of forest-thinning, or using wasted lumber or sawdust from sawmills. Preferably from the viewpoint of resource conservation, some existing fractions of

a desired particle size may be selected for use. Alternatively, lumber end-scrap or chips may be shredded into minute particles to provide the wood powder.

[0011] The binder contained in the wall-coating material may preferably be any starch-based one such as rice starch, flour, potato starch or the like that are inexpensively available. A glue plant powder may be added to the binder.

[0012] Among an employable variety of each of the fungicide, antiseptic and flame retardant, those which are available on the market are preferable herein. As for the pigments, rock-based ones that are powders of natural stones or rocks, or man-made metallic ones are useful because they will not generate and emit any toxic gases even if burnt. Some non-resinous and water-soluble natural colorants originating from flowers or trees may also preferably be used.

¶ ADVANTAGES AFFORDED HEREIN

[0013] As described above, the wall-coating material of the present invention is mainly composed of the wood powder, that is blended with the solidifying natural binder, the fungicide, antiseptic, flame retardant and pigments. Even if this material is burnt up, any elevated temperatures or fire flame will never cause it to emit hazardous gases. The present wall-coating material can be used safely without fear of bringing about any unforeseen accidents or dangers.

[0014] Further, both the wallpaper and wall-forming material produced herein using such a coating material do not contain any amount of synthetic resins added thereto. When discarded after use, they may be buried in earth as biodegradable wastes. Even if burnt, they will not generate any toxic gases during an easy incineration process. They are excellent in air permeation and humidity regulation owing to their hygroscopic and moisture

discharging nature, so that variation in room humidity will be reduced by them. They will be protected from dew condensation, thus contributing to a pleasant and comfortable living atmosphere even within a hot and humid environment as in Japan. In addition, they can be produced at considerably lower manufacture cost, nevertheless affording a soft and high-grade texture.

BEST MODES OF CARRYING OUT THE INVENTION

[0015] In one of the best modes of carrying out the present invention, a wood powder as the principal ingredient of the present wall-coating material may be a mixture of 120 mesh powder and 200 mesh powder, blended with each other at a ratio of about 1 : 1. If only one kind of powder of a given particle size is used, it is easy to make smooth the coated surface. If in contrast two or more kinds of powders of different particle sizes are used, then smaller particles will tend to be settled close to the substrate surface, with coarser particles coming up to the coating surface. Fine roughness thus produced will afford an airy and puffy feeling to the coated surface. As mentioned above, mixed with this wood powder are: a dry and powdery binder, fungicide, antiseptic, flame retardant and pigments, respectively at the ratios given below.

THE PREFERRED EXAMPLES

[0016] An example of the wall-coating material was prepared using 78 % by weight of a wood powder consisting of a 120 mesh powder and a 200 mesh powder, blended with each other at a ratio of about 1 : 1. Blended with this powder was 10 % by weight of a binder that had been prepared by mixing 20 % by weight of a glue plant powder with a rice powder. Further, 2 % by weight of the sum of a fungicide and an antiseptic, as well as 7 % by weight of a flame retardant and 3 % by weight of a natural pigment made of

a rock powder were added to and kneaded with the mixture of wood powder and binder so as to obtain a homogeneous mixture. The respective contents of these ingredients are given herein merely by way of example, and can be modified properly, if necessary.

[0017] Seven parts by weight of water was added to one part by weight of such a wall-coating material as prepared above, and kneaded in a cement mixer to provide a paste. Subsequently, a plasterer was asked to use a trowel to apply this paste to the surface of plywood plates that were under construction. 1 kg of the paste was sufficient to cover said surface of about 9 m^2 , thereby forming a coating about 1 mm thick.

[0018] The plasterer was also asked to apply the paste of wall-coating material in an overlaying manner to the surface of a plaster layer previously formed on an earthen wall. The resultant overlaid layer was then dried and thereafter occasionally got dripping wet from the rain underwent. However, the overlaid coating layer did neither fall down nor show any surface irregularities caused by the rain, or any stains or blots after having dried again naturally.

[0019] Six parts by volume of water was added to one part by volume of the wall-coating material, and kneaded to give a mortar-like or paste-like mixture. 1 kg of this mixture was applied to the surface of a fiber-based cloth with an area of 5 m^2 , and then dried at $20\text{ }^\circ\text{C}$ (viz., at room temperature) to thereby give a wallpaper having a dried coating of average thickness of 1.2 mm .

[0020] The wallpaper thus produced had the wall-coating material layer that was firmly secured to the surface of substrate cloth, owing to the binder contained in said layer. Wood powder particles disposed in and near the outer surface of the coating layer did form a pattern of fine roughness,

whilst the other particles facing the substrate cloth did migrate in between constituent fibers thereof. The coating layer was thus fixedly attached to the substrate, without fear of slipping off the resultant wallpaper of a texture that afforded thereto a soft and excellent feeling both in the touch and in the sense of vision.

[0021] The mortar-like mixture of wall-coating material was similarly and directly applied also to concrete blocks, wooden panels, plaster boards or the like so as to produce composite wall-forming materials. It was confirmed that their decorative surfaces thus formed on such massive substrates were firmly anchored thereto.

USES IN THE INDUSTRIAL FIELDS

[0022] The wall-coating material of the invention may directly be applied to any concrete, earthen or wooden walls disposed inside or outside the existing houses. This material is ready for wide use as a material with a woody and finely roughened feeling of warmth, and the wall-forming material with such a surface is adapted to a variety of latent uses.